Amendments to the Claims

Please cancel claims 2 and 12. Please amend claims 1, 3-6, 8, 10-11, 13-16, 18, 19, 21, 22 and 24. Please add new claims 27-36. The Claim Listing below will replace all prior versions of the claims in the application:

Claim Listing

1. (Currently Amended) A method of displaying a holographically generated video, said video ~~image~~ comprising a plurality of video frames, the method comprising providing for each frame ~~period~~ a respective sequential plurality of holograms to reconstruct the frame, and displaying to a human observer the holograms of each of the plural video frames on a diffractive display device for viewing the replay field thereof, wherein said frames are displayed quickly enough for the limited temporal bandwidth of the eye of said observer to impart an effect of ~~whereby the~~ noise variance attenuation due to averaging, whereby the noise variance of each frame is perceived by said human observer as attenuated by averaging across said plurality of holograms.

2. (Cancelled)

3. (Currently Amended) A method according to claim [[2]] 1, wherein the providing step comprises generating each hologram by implementing an algorithm having a single step that is a Fourier transform step.

4. (Currently Amended) A method according to ~~claim 3~~ claim 1, wherein said plurality of holograms comprises a plurality of pixellated holograms and the providing step comprises generating each hologram by implementing an algorithm ~~the algorithm is~~ arranged, for each said plurality of pixellated holograms, to:

a) form a first data set, each member of the first data set having an amplitude equal to an [[the]] amplitude of a [[the]] desired frame pixel;

b) inverse Fourier transform the first data set to provide a second data set;

c) shift the second data set in a [[the]] real direction in the complex plane sufficiently to form a third data set in which the phase of each data point of the third data set is small;

d) form as a fourth data set the magnitude of the third data set; and

e) binarise the fourth data set to form a fifth data set for display as a said hologram.

5. (Currently Amended) A method according to claim 4 wherein the step of binarisation comprises thresholding about [[the]] a median of the fourth data set whereby the fifth data set has a dc balance and low reconstruction error.

6. (Currently Amended) A method according to claim 4 or 5, wherein the display device comprises a binary phase [[a]] spatial light modulator having a pixellated phase mask imposing phase shifts of 0 and $\pi/2$, wherein the algorithm is arranged to generate a four-phase hologram, wherein each pixel of the display device has ~~one of the~~ a value[[s]] such that it imposes a phase shift of one of [0, $\pi/2$, π, 3 $\pi/2$]. ~~1, j, -1, -j~~]

7. (Original) A method according to claim 6, wherein the pixel values of the phase mask are spatially random.

8. (Currently Amended) A method according to claim 7, wherein step b) comprises inverse Fourier transforming and then applying the phase mask values to the first data set to provide the second data set.

9. (Previously Presented) A method according to claim 1 wherein the image is a 2 dimensional image.

10. (Currently Amended) A method according to claim 3 further comprising using ~~forming~~ both [[the]] real and imaginary parts of said transformation to provide ~~the inverse Fourier transformed first data to form two second data sets, whereby~~ two said holograms for display per transformation ~~are created per Fourier transform step~~.

11. (Currently Amended) Apparatus constructed and arranged to display a holographically generated video, said video ~~image~~ having a plurality of video frames, the apparatus comprising ~~having~~ processing means arranged to provide for each frame ~~period~~ a respective sequential plurality of holograms to reconstruct the frame, and a diffractive ~~and a~~ display device arranged to receive the sequential plurality of holograms of each frame and to display to a human observer the holograms of each of the plural video frames of the video ~~image~~ for viewing the replay field thereof, wherein said frames are displayed quickly enough for the limited temporal bandwidth of the eye of said observer to impart an effect of noise variance attenuation due to averaging, whereby the noise variance of each frame is perceived by said human observer as attenuated by averaging across said plurality of holograms.

12. (Cancelled)

13. (Currently Amended) Apparatus according to ~~claim 12~~ claim 11, wherein the processing means is arranged to generate each hologram according to a single step that is a Fourier transform step.

14. (Currently Amended) Apparatus according to ~~claim 12~~ claim 11, wherein said plurality of holograms comprises a plurality of pixellated holograms and the ~~algorithm~~ processing means is arranged, for each said plurality of pixellated holograms, to:

a) form a first data set, each member of the first data set having amplitude equal to an [[the]] amplitude of a [[the]] desired frame pixel;

b) inverse Fourier transform the first data set to provide a second data set;

c) shift the second data set in a [[the]] real direction in the complex plane sufficiently to form a third data set in which the phase of each data point of the third data set is small;

d) form as a fourth data set the magnitude of the third data set; and

e) binarise the fourth data set to form a fifth data set for display as [[a]] said hologram.

15. (Currently Amended) Apparatus according to claim 14, wherein the step of binarisation comprises thresholding about a [[the]] median of the fourth data set whereby the fifth data set has a dc balance and a low reconstruction error.

16. (Currently Amended) Apparatus according to claim 11[[,12]] or 13, wherein the display device comprises a binary phase spatial light modulator having a pixellated phase mask imposing phase shifts of 0 and $\pi/2$, wherein the ~~algorithm~~ processing means is arranged to generate a four-phase hologram, wherein each pixel of the display device has a ~~one of the~~ value[[s]] such that it imposes a phase shift of one of [0, $\pi/2$, π, $3\pi/2$] ~~[1,j, -1, j]~~.

17. (Original) Apparatus according to claim 16, wherein the pixel values of the phase mask are spatially random.

18. (Currently Amended) Apparatus according to claim 17, wherein step b) comprises inverse Fourier transforming and then applying the phase mask values to the first data set to provide the second data set.

19. (Currently Amended) Apparatus according to ~~claim 14 or any claim dependent upon claim 14, further comprising forming both the~~ claim 13 wherein said apparatus is further configured to use both of said real and imaginary parts of said transformation to provide ~~the inverse Fourier transformed first data to form two second data sets, whereby~~ two said holograms for display per transformation ~~are created per Fourier transform step~~.

20. (Original) A method of generating pixellated holograms, the method comprising

forming a first data set, the members of said first data set having respective amplitudes equal to the amplitudes of respective desired pixels;

performing an inverse Fourier transform on the first data set to provide second data set;

shifting the second data set in the real direction in the complex plane sufficiently to form a third data set in which the phase of each data point is small;

forming as a fourth data set the magnitude of the third data set; and

binarising the fourth data set to form a fifth data set for display as a said hologram.

21. (Currently Amended) A method according to claim 20 wherein the step of binarisation comprises thresholding about [[the]] a median of the fourth data set whereby the fifth data set has a dc balance and low reconstruction error.

22. (Currently Amended) A method according to claim 20 or 21, wherein the display device comprises a spatial light modulator having a pixellated phase mask imposing phase shifts of 0 and $\pi/2$, ~~wherein the algorithm is arranged to generate~~ the method further comprising generating a four-phase hologram, wherein each pixel has one of the values $[1,j,-1,-j]$.

23. (Original) A method according to claim 20, wherein the pixel values of the phase mask are spatially random.

24. (Currently Amended) A method according to claim 20 or 21, further comprising applying the phase mask values to the first data set to provide the second data set.

25. (Previously Presented) A method according to claim 20 wherein the image is a 2 dimensional image.

26. (Previously Presented) A method according to claim 20 further comprising forming both the real and imaginary parts of the inverse Fourier transformed first data to form two second data sets, whereby two holograms are created per Fourier transform step.

27. (New) A method according to claim 1, wherein the noise fields of said holograms comprise independent and identically distributed noise.

28. (New) A method according to claim 1, wherein the providing step comprises generating each hologram by implementing a Fourier or Fresnel transformation and taking the real or imaginary part of the transformation to provide said hologram.

29. (New) A method according to claim 1, further comprising modulating a light intensity of a light source illuminating said diffractive display device in accordance with the number of on pixels in said replay field to achieve substantially uniform overall brightness between said frames.

30. (New) A method according to claim 1, wherein said diffractive display device comprises a display device able to display more than two phase levels, and wherein the method includes generating holograms having more than two phase levels for said diffractive display device.

31. (New) A method according to claim 1, wherein said holographically generated video is multi-colour video.

32. (New) Apparatus according to claim 11, wherein the noise fields of said holograms comprise independent and identically distributed noise.

33. (New) Apparatus according to claim 11 wherein the processing means is arranged to generate each said hologram by implementing a Fourier or Fresnel transformation and taking the real or imaginary part of the transformation to provide a said hologram.

34. (New) Apparatus according to claim 11, wherein said apparatus is further configured to modulate a light intensity of a light source illuminating said diffractive display device in accordance with the number of on pixels in said replay field to achieve substantially uniform overall brightness between said frames.

35. (New) Apparatus according to claim 11, wherein said diffractive display device comprises a display device able to display more than two phase levels, and wherein the processing means generates holograms having more than two phase levels for said diffractive display device.

36. (New) Apparatus according to claim 11, wherein said holographically generated video is multi-colour video.